Q
379.747
N4832
B

VASSAR COLLEGE LIBRARY

2 APR 1932

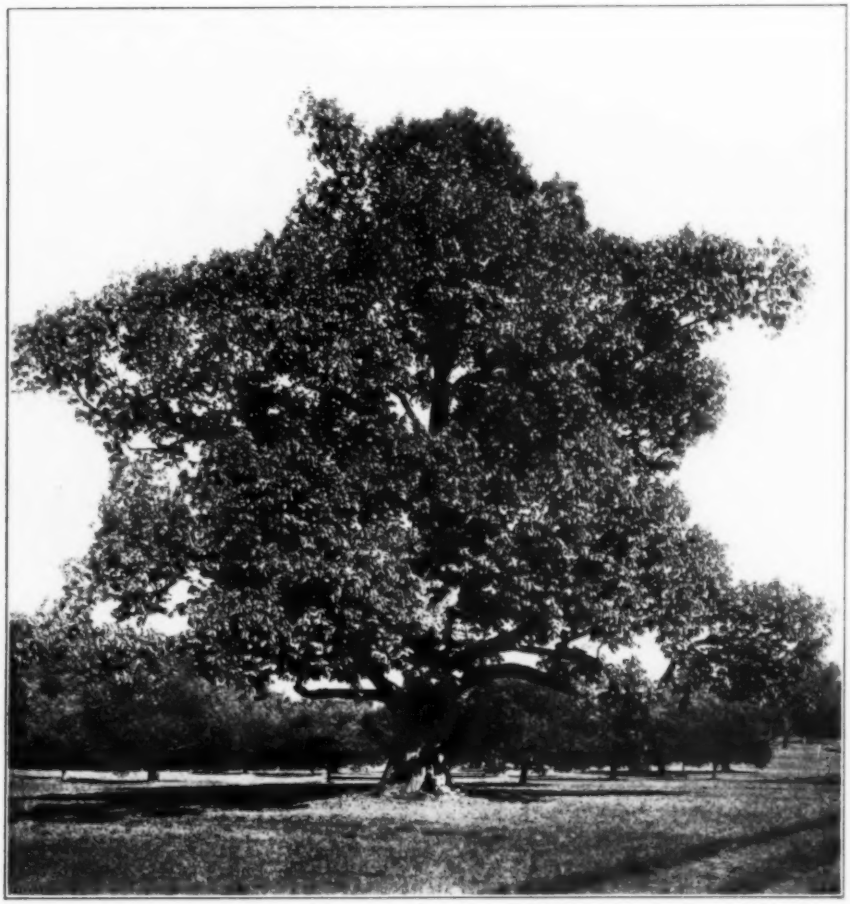
STATE EDUCATION DEPARTMENT

THE UNIVERSITY OF THE STATE OF NEW YORK

BULLETIN TO THE SCHOOLS

VOL. 18 APRIL 1, 1932 NO. 14

Arbor Day Number



Photograph by U. S. Forest Service

A Vanishing American — the Chestnut

Can We Bring Back the Chestnut?

By Arthur Harmount Graves, Curator of Public Instruction, Brooklyn Botanic Garden

When I was a boy it was our family's custom to make a pilgrimage some time during the month of October up into the hills of Litchfield county, Connecticut. An early morning train carried us from our home in Hartford to Terryville, and then two successive stage-coach lines brought us through Plymouth and Naugatuck to the little hill town of East Morris. The frosty autumn weather, the pure bracing air of the Connecticut hills and the kaleidoscopic colorations of the autumn foliage were some of the pleasures we enjoyed, but the avowed purpose of our trip was to gather nuts on the large farm where we stayed — chestnuts, hickory nuts, and occasionally hazel nuts. There were many large chestnut trees with tall, straight boles in the forests round about; and sometimes, also, in the open fields, isolated individuals flourished, whose trunks were more massive than those in the forest and whose branches were lower down and more spreading.

Photograph by U. S. Forest Service
An Opening Chestnut Bur

By the time we arrived at the farm the large spiny burs of fruit with which the chestnut trees were well laden, if it was a "good chestnut year," had cracked open, disclosing the glossy, brown nuts, two or three together, nestling snugly in the soft, white, velvety lining of the bur; or else the autumn breezes had already shaken them out onto the mat of fallen leaves covering the ground. Then came the gathering of the nuts. What fun it was in the crisp October air to find those sleek, brown fellows packed with food and sweetness — the joy of discovery plus the joy of collection. Sometimes one had to poke them out from under the leaves and sometimes they were lying in plain sight for bright eyes to see.

Today, alas, a change has come over our woodlands. The mighty chestnuts, monarchs of the forest, are no more. Where were tall, stately trees are now gray, weathered skeletons, or only decaying stumps, whose enormous size and plentiful annual rings are the epitaphs of the noble trees that flourished here. No boy or girl who reads this has ever known the joys of a chestnutting expedition, and probably he has never even seen a chestnut bur. A dread disease like unto one of the plagues visited upon the ancient Egyptians has swept over our land, and these noble trees have succumbed slowly and unwillingly, fighting off death inch by inch, until a few scattered sprouts of small dimensions are nearly all that remain over the natural range of the chestnut.

Not for its nuts alone was the chestnut esteemed. If one is to judge from the variety of uses to which it was put, and the extent to which it has been used for each of these purposes, the American chestnut is, or *was*, the most valuable of our forest trees, the one which least of all we could afford to lose. A tall, fast-growing tree, especially from sprouts, its timber is remarkably durable in the soil, being less prone to decay than oak. These two characteristics made it invaluable for telephone and telegraph poles, which must be tall and straight and with one end in the soil. Its durability in the soil also rendered it

Photograph by U. S. Forest Service

A Chestnut Tree in the Forests of North Carolina Before the Advent of the Blight

extremely useful for railroad ties. For these two purposes no native wood can take its place. The timber also has been highly valued for furniture, resembling ash in appearance, and it has been used for structural timbers of houses.

Besides these uses the bark and the wood are used in the production of tannic acid, for tanning leather; chestnut is one of the principal sources from which this substance is obtained. Finally, as an ornamental tree, the American chestnut has been highly prized: many fine old estates along the Hudson, through New England and farther south were noted for their massive, patriarchal chestnut trees.

Strange to say, the cause of this disaster, involving the loss of millions of dollars worth of timber, is a tiny plant, the spores or reproductive bodies of which are so minute as to be invisible to the naked eye. The malefactor is not an insect, as some persons still believe, but a fungus plant, belonging to the same general group as the molds that are commonly seen growing on old bread, decaying vegetables or on any organic matter, where sufficient warmth and moisture are at hand. But, unlike the fungi just named, it derives its nourishment from living tissues and is therefore a parasite. Apparently it was brought into this country on exotic chestnuts imported from the Orient — a stowaway, so to speak — and an alien of most undesirable character, which, if our present quarantine laws had then been in force, might have been excluded. It was first noticed killing a chestnut tree at the New York Zoological Garden in 1904, but there is evidence that it had been in this country long before this, perhaps ten years earlier. In spite of all efforts to check its spread, the fungus flourished and increased the radius of its operations over the country, with New York City — apparently its port of entry — as the center. Its reproductive bodies — the spores — being tiny, were easily carried by the wind, on the feet of birds or on the bodies of insects. If a spore chanced to lodge in some wound in the bark of a chestnut tree, it germinated and formed the fungus plant inside the bark, its food being absorbed from the living tissues of the bark and from the cambium or growing layer. Gradually the fungus increased in the living bark, extending laterally around the tree until it completely girdled the trunk or branch, killing all portions of the tree above the diseased area. It took a long time — sometimes 10 or 15 years — for the fungus to kill a tree, especially if it were one of the patriarchs we have described. Even today, right in the vicinity of New York City, a very few of these bicentenarians or tricentenarians

are desperately holding on to a thread of life. Their roots, as we have learned by experiment, resist the attacks of the fungus to a certain extent, so that when the trunk dies the roots are usually still alive. Sprouts soon appear at the base of the trunk on the "root collar," and these sprouts may grow 10 or 15 years before they too become infected with the disease either through some wounds in the bark or by contamination at the base from the old, diseased, parent stump. It is the development of the sprouts that has occasioned the popular belief that the chestnut is "coming back" right here and now. It is fortunate, indeed, that occasionally these sprouts reach the age at which they can bear nuts, for this means that the chestnut can still reproduce its kind, and that we shall never lose it entirely, as a species, as long as this capacity exists. Nevertheless, it has been reduced from the status of a stately forest monarch to that of a small shrub or undersized tree — dropped, so to speak, from the position of a useful forest citizen to the kindergarten grade — and all due to the relentless activities of a microscopic parasite.

Not in all recorded history has any plant species been completely wiped out by a disease. Some individuals, either because of their inherent constitution, or on account of more favorable environment, have escaped. This is of course true also with regard to human diseases; many individuals, even though they may be "carriers" of the parasite, are immune to its attacks. And so the search for an American chestnut tree immune to the bark disease, caused by *Endothia parasitica*, has been prosecuted unremittingly for many years by the Division of Forest Pathology of the United States Department of Agriculture and others. Many individuals have been discovered in the course of the search, that evince a considerable degree of resistance to the parasite, and these are being propagated in the nurseries of the Department of Agriculture and elsewhere.

We see a brighter side to this discouraging story when we consider the Japanese and Chinese chestnuts. In many parts of the Eastern States today these trees are flourishing. I know of some splendid Japanese chestnut trees on Long Island, with trunks more than a foot in diameter, bearing fine crops of nuts each year, although the woods all around them are full of the corpses of their American cousins. Apparently these oriental trees are not entirely immune — at least I have never found one of good size that did not have suspicious spots in some part of its trunk, or perhaps a small branch or two affected with blight here and there. Their resistance is so great, however, that it amounts practically to immunity. Apparently they possess some quality that is "distasteful" to the fungus. It is reasonable to assume that the fungus has existed in their home country for thousands of years, and has long ago killed out all the susceptible individuals. The oriental races now existing are therefore descended from those few that possessed a certain degree of immunity. Possibly a similar development of immune races might result in this country after a long period of years. We must not forget, too, that there is always the possibility that the parasite itself might lose its virulence through natural causes.

Without waiting an untold number of years for such remote possibilities we have the materials now ready at hand for bringing the chestnut back. Obviously the oriental chestnuts are the key to the situation. These trees have stood the test in this country and have proved themselves blight resistant. They are low, round-headed trees, however, of value as ornamentals and for their nuts rather than for their timber. This, then, is a problem in plant breeding — to combine the disease-resistant quality of the oriental chestnuts with the tall-timber quality of the American forest tree. With the Division of Forest Pathology of the United States Department of Agriculture this work has been going on for some years. At the Brooklyn Botanic Garden, which is cooperating with the Division of Forest Pathology on the problem, ten hybrid nuts of the Japanese and American chestnuts were secured two years ago, but unfortunately none of these germinated. Last year the experiments were carried out on a larger scale. I have described elsewhere in detail the methods employed in this work (Brooklyn Botanic Garden Record, 21:47–54; 1932). Six fine Japanese trees located on Long Island and in New Jersey were crossed with pollen from American chestnuts, more than 600 flowers in all being pollinated. The result was 124 nuts, presumably hybrids. Many of these are now germinating in the greenhouses of the Brooklyn Botanic Garden, and will be planted out in the

open this spring. Their rate of growth and immunity to the blight fungus — for they will be planted near diseased American chestnuts — will be carefully watched. It seems reasonable to expect that at least a few will show the desired combination of the parental characters; namely, a lofty tree like the American chestnut, but disease-resistant like the oriental. Plant breeding has performed greater miracles than this; as in the classic examples of the tangerine crossed with grapefruit, producing the "tangelo"; the wilt-resistant watermelon produced by Doctor Orton; and numerous results of practical value attained by crossing varieties of cotton, wheat, corn etc.

Another way in which we may be able to bring back the chestnut is by continued and persistent search for resistant American stock. Any of the wild sprouts that are thrifty and vigorous — but not necessarily these alone — may represent a stock that is now varying along the line of greater resistance to the fungus. There is considerable significance in the fact that some of these sprouts are living to the age when they can bear nuts. These nuts should be carefully gathered, labeled as to source and planted. We must continually bear in mind that variation is one of the great laws of nature. The navel orange — certainly a great departure from the ordinary orange — was the result of a "bud variation," and so have been hundreds of varieties of pears and apples now grown in this country. Therefore the chances for bud variation in the American chestnut giving rise to a resistant stock should not be overlooked. From our experience with other plants there is every reason to expect that variation in this direction may occur. Boys and girls, as well as their elders, can help in this scouting work, especially in the fall when the nuts of the chestnut sprouts ripen. The nuts should be mailed as soon as possible after they are collected, to the Division of Forest Pathology, United States Department of Agriculture, Washington, D. C., or to the Brooklyn Botanic Garden, 1000 Washington avenue, Brooklyn, N. Y. If they are allowed to dry out before they are mailed, the result is fatal. Once a chestnut becomes dried out, it will not germinate. Therefore, if the nuts are packed in slightly moistened leaf humus or even slightly moistened paper, and mailed immediately, they will usually arrive at their destination in good condition. The name of the collector, place of collection, date, and if possible, the age of the tree, should accompany the specimens.

Planning and Planting School Grounds in Towns and Cities

BY FRANK A. WAUGH, PROFESSOR OF LANDSCAPE ARCHITECTURE, MASSACHUSETTS STATE COLLEGE

In spite of all difficulties — and they are great — much can be done to improve the condition of school grounds in towns and cities. Careful planning is the first necessity to this end. Unfortunately these possibilities are widely overlooked. While it is considered necessary to employ a good architect to make the best possible plan for the interior of the building, it is commonly thought adequate to leave the grounds to the bland imagination of any handy contractor.

Nevertheless the grounds often represent quite as many square feet of space as the floors of the school building itself, sometimes more. This space is available and valuable for many legitimate school uses. If these uses were more clearly defined it would be possible for the architect or landscape architect so to plan the school grounds as to satisfy the requirements much more fully than is possible under the usual thoughtless practice.

The first problem arises in making the utmost use of the terrain. Nearly always the land will need grading and drainage. If the natural contours are considerably out of level, so that the construction of terraces and retaining walls becomes necessary, the problem assumes considerable proportions, both as to difficulty of planning and as to expense of construction. Obviously it is impossible here to explain how all these problems are to be solved. All we can do now is to place emphasis upon the im-

School Building with Large Lawn and Heavy Plantings

portance of these problems and the necessity of employing competent planners to develop such grounds.

The second problem comes with surfacing. Many school grounds are now completely laid down to cement. This seems a most deplorable treatment, both for the grounds and for the school children. We may say very positively that a general cement paving of school grounds is never in order. Something better can always be done.

On grounds where it is impossible to grow any grass, perhaps a clean gravel paving for the playground, with walks of cement or brick, will supply the best general answer. If the gravel is well selected, well screened, well laid on a good foundation, with proper subdrainage, it will make a clean and dependable playground for the school children, minus the intolerable harshness of cement.

Of course grass is ideal. As far as it is possible to maintain decent turf on a school ground, turf should be chosen in preference to any sort of paving.

The turf problem is frankly a difficult one on any school ground; yet there are a large number of grounds on which turf may be maintained, at least over a portion of the area, if there be given to it anything like the amount of attention which is given to turf on the putting greens of golf courses. Sad to say, there are very few school grounds on which the grass has had any such attention as it receives on good golf grounds.

Even if the main areas of the school grounds can not be maintained in turf, it may still be possible to have turf borders, to have a turf panel at the main entrance, or somewhere else in the ground pattern to secure small, well-defined, carefully planned turf areas which will add much to the coolness, greenness and general character of the school yard. Obviously the planning of such turf patterns is something which can not be left to the janitor.

Trees come in for next consideration. If it is possible to maintain a few trees on the school grounds, even two or three, they will be most acceptable. These may be placed as a row along the street line, or there may be a pair of trees at the entrance of the schoolhouse. On comparatively large grounds there may be trees in the rear yard. Any ground which can maintain a few large, dignified shade trees has an asset much more valuable than a picture of the Roman Colosseum on the schoolroom walls.

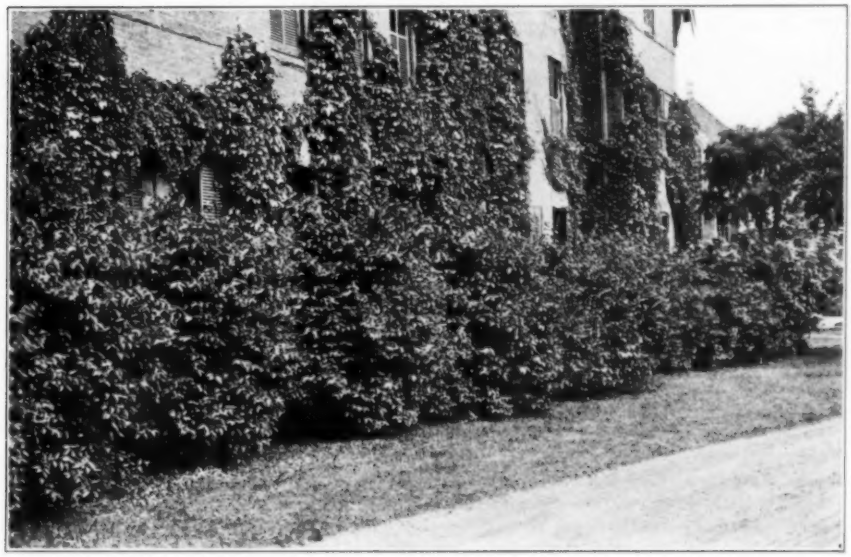
Buildings which are not too heavily crowded by playing children may be improved by simple foundation plantings. Such plantings are impossible in areas of free play and they should not be undertaken anywhere without careful consideration of eventualities. Where conditions are favorable it is a simple matter to arrange such foundation plantings, and they add enormously to the beauty of any large public building such as a schoolhouse.

In connection with these foundation plantings vines are always to be considered. Indeed vines can be grown on the walls of some school buildings where foundation plantings are impossible. Japanese ivy is perhaps the best vine for general use, but the native woodbine is also excellent and in some places the winter creeper (*Euonymus*) gives very satisfactory results.

When all else fails it is still possible to have good window boxes during the spring and summer months. In most schools and with most teachers it is possible to interest the pupils in an enterprise of this sort. Sometimes it is feasible to make and paint the window boxes. Planting and care ought always to be available from the school itself.

Finally, attention may be called to the possibility of improving the school grounds by means of latticed trellises along the property lines, upon which trellises may be grown such climbing vines as the woodbine, climbing roses, Dutchman's pipe vine, and several other hardy sorts which require little or no care after they are once established.

In fact, there is very much that can be done for the amelioration of school grounds provided someone takes the problem in hand. That someone probably ought to be the school superintendent or the school board. In general, good results can be expected only when a competent landscape architect or landscape contractor is employed to carry out the work. There is much to be done and it requires a certain amount of technical knowledge. It is better to begin with a good plan, do a little at a time and do it well, remembering that good planning, good order and cleanliness are much more important than any amount of "ornamental doodads."



Foundation Plantings and Vines for School Building

The University of the State of New York

Bulletin to the Schools

Issued semimonthly during the school year by the State Education Department

CHARLES F. PROBES, *Editor*

This bulletin is sent without charge to all schools and educational institutions of the State. To others it will be mailed postpaid for 50 cents a year, 5 cents for single copies.

Entered as second-class matter September 30, 1914, at the post office at Albany, N. Y., under the act of August 24, 1912. Acceptance for mailing at special rate of postage provided for in section 1103, act of October 3, 1917, authorized July 19, 1918.

APRIL 1, 1932

Arbor Day Dates

The dates of April 22d, April 29th and May 6th have been designated by Commissioner of Education Frank P. Graves for the observance of Arbor Day in this State. In his Arbor Day proclamation, printed in the March 1st issue of the Bulletin, Commissioner Graves recommended that local authorities determine which of these dates be used.

Assistance in the preparation of this issue of the Bulletin was given by the New York State Museum, of which Dr Charles C. Adams is Director. The appreciation of the Editor is expressed to him and to the contributors.

—o—

Wild Flower Books and Plates Available

The State Education Department still has available a number of New York State Museum memoirs on Wild Flowers of New York and also portfolios of the wild flower plates. The memoir is in two volumes and contains 264 colored prints in addition to numerous photographic illustrations and also descriptions of more than 400 of the most conspicuous wild flowers of the State. Included in the introduction is a chapter on the structure of the plants with particular reference to flowers and leaves. The author is Dr Homer D. House, State Botanist of the State Museum.

The two volumes are sold for $7 with shipping charges paid within New York State. The two volumes weigh 14 pounds. The portfolio of the 264 plates is sold for $2.50 plus postage. The portfolio weighs five pounds. Orders must be accompanied by remittance made payable to the New York State Education Department.

—o—

Allegany School Offers Natural History Courses

The Allegany School of Natural History will conduct its sixth session beginning July 5th and ending August 24th. The school is located in the Allegany State Park south of Salamanca and is the only outdoor school of its kind in the State where work of college grade is given in the woods.

The school was established to meet the need for outdoor study and training in the study of natural history. The central principle of instruction is to guide the student in personal observation in the field, in studies in the laboratory and in reading with a view to enabling him to develop powers of observation, thought and judgment.

Field courses are given in botany, zoology, physiography and geology, birds and nature study. In addition, the facilities of the school are available to a limited number of advanced students and specialists who wish to pursue researches appropriate to the region.

The director of the school is Dr Robert E. Coker and the dean of women is Mrs Coker. Doctor Coker also gives courses in field zoology. The courses in field physiography and field zoology will be given by Frederick T. Thwaites of the University of Wisconsin; in botany by Dr Robert B. Gordon of Ohio State University; in the natural history of birds by Aretas A. Saunders, field naturalist of the New York State Museum; and in nature study by William P. Alexander, field naturalist of the Buffalo Society of Natural Sciences.

The school is conducted by the Buffalo Society of Natural Sciences in cooperation with the New York State Museum and is affiliated with the University of Buffalo, which gives college credits for courses taken at the school.

Registration should be completed before June 15th. Application should be made to Dr Robert E. Coker, Box 950, Chapel Hill, N. C. A circular of information gives full details as to equipment needed by each student. The cost of tuition, board and lodging is $150 for the session.

New Outlook for Arbor Day

BY GURTH WHIPPLE, NEW YORK STATE COLLEGE OF FORESTRY, SYRACUSE UNIVERSITY

Arbor Day this year offers an unusual opportunity for teachers and school children in forestry education. A new era has dawned. The passage of the Hewitt reforestation amendment to the Constitution of New York not only brings to public attention most emphatically the need for reforestation but it has committed the State to the practice of scientific forestry on the areas that will be acquired under this act, that is, the economic management of forests on a sustained yield basis. This is the goal for which foresters in New York have been striving many years. It marks a new epoch in the forest history of New York.

The forests in the eastern United States reached such a state of depletion before foresters began to take hold of the situation that actual forestry, as understood by the profession, has not been possible. Only artificial reforestation has attracted general attention. Artificial reforestation, however, is a small part of forestry, the main point being the proper handling of the woodlands in order to bring about maximum economic yield which should be balanced with consumption. This the Hewitt amendment has assured for more than a million acres of woodlands.

It is, therefore, timely to introduce to school children, in an elementary way, this ultimate goal of the forester. It is in keeping with the new policy of the State to consider the permanence of forests, forest industries and continuous sources of forest revenue to the municipalities and in many cases to schools where schools have planted forests. The State is planning to use the new plantations as permanent forests. They will be properly protected from fire, insects and disease; they will be thinned at certain intervals, the products being used to the best advantage economically, and eventually a mature crop of timber will be harvested. From that point a new order will be established. A growing stock will be left in the forest and, like the principal of an investment, it must always be there to mature from time to time so that the forest will become a perpetual source of employment and of raw materials, which in turn will mean steady employment and stabilized industry.

This viewpoint of forestry may now be injected with practical application in Arbor Day exercises. The pupils may be instructed that reforestation, natural or artificial, is only the first step in a well-rounded plan of growing forests on a permanent basis. One of the first things for which provision should be made in the handling of young or mature forests is to organize protection from forest fires, grazing by live stock and attacks by insects and disease. There are definite methods for protecting forests from these enemies. Fire lines may be constructed against fires, notices may be posted warning persons entering the forest to exercise extraordinary care in the use of fire. Currant bushes, upon which the white pine blister rust develops in one stage of its life cycle, should be destroyed within a thousand feet of the forest. Special treatments are applied in the case of weevils and other insect enemies, such as cutting and burning the affected leaders of the young trees in the spring, as is often done in the case of the white pine weevil.

In the handling of a woodlot, the aim should be to utilize the merchantable material and improve the area for future growth. In an advanced woodlot certain trees should be removed. The trees to be cut include large overmature, wide-spreading trees, dead, dying or defective trees, badly crooked or leaning trees and also the less valuable species, sometimes called weed trees, such as ironwood, blue beech, red cherry and moosewood. The principal thing to keep in mind in the management of the forest is that a growing stock should be maintained at all times. Trees of this type should never be cut except where thinning is necessary. They should include the young, thrifty trees economically valuable, such as black walnut, white and red oak, ash, hard maple, black cherry, basswood, tulip poplar, white pine and the spruce trees. The extent to which cutting may be done should be determined by a forester. The thinning depends upon the kinds and numbers of overmature trees, the condition of the younger trees and the amount of reproduction on the ground.

Generally, it is not advisable to make large openings in the woods as they allow the sun and wind to dry out the soil. Where large openings do exist they should be artificially planted.

The sort of trees to be saved as a general rule could be pointed out to the pupils and in this way they would learn to identify trees of greatest commercial value in the forest. This would tend to keep them up-to-date on the progress of forestry and to stimulate their interest in the general plan for the future. At the same time the influence that forests have upon watershed protection, wild life preservation and prevention of erosion could be explained.

Leaflets available at the New York State College of Forestry at Syracuse University contain information on these subjects and might be useful to teachers and pupils in connection with Arbor Day exercises. In view of the new turn of events that forestry in New York State has taken through the passage of the Hewitt amendment, it would seem that some of these elementary details as to how the forests of the future will be built and managed could be used to advantage. It will at least aid in showing the younger generation, who will become the trustees of New York State's future forests, something of what may be expected in relation to this responsibility.

Does Your Community Have a Wild Life Sanctuary?

BY MARJORIE RUTH ROSS, CORNELL UNIVERSITY

While there are many nature preserves or wild life sanctuaries located in various parts of the country, it is quite possible that no such area has been set aside in your community. If there is none, that in itself should be a challenge to you and other nature lovers to set as your goal a local plant and animal sanctuary. Such a preserve does not need to be large in extent, neither does it need to be a beautifully planted estate. On the contrary, almost any plot of ground may be used for a wild life sanctuary; and if already wooded, this is a special point in its favor. If it includes a stream or pond, so much the better, for water attracts many kinds of plants, birds and aquatic animals.

Such a project as the acquisition of a local preserve, if brought to the attention of a landowner in the community, might easily be developed under special protection. Then too, at present there are thousands of acres of idle land in New York. Some of these tracts might be called into useful service as local nature preserves.

A nature preserve is a good place to spend some leisure time. The communities which already possess nature preserves are to be congratulated; but let us ask them how much these preserves are used. Do many local people visit them to enjoy but not destroy the wild life found there? These preserves are to be used and then handed on to the next generation unspoiled, as a perpetual source of outdoor pleasure and recreation. Here people who do not own land may come and feel free to study and enjoy the outdoors, without intruding upon the rights of private landowners. Each individual has, or should have, some leisure time; if some of this can be spent in the wholesome, healthful and comparatively inexpensive pursuit of a nature hobby, it is surely a more profitable expenditure than is often made of such time.

A typical local preserve, salvaged from some of the idle land of New York, is to be found in an area of about 110 acres known as "Ringwood Wild Life Preserve." It is located about nine miles east of Ithaca and is under the control of Cornell University. A preliminary biological survey of this area is now under way; and an attempt is being made to study the plants and animals at all seasons. Various interesting relationships are being worked out as observations are made on flowering plants, mosses, lichens and fungi, as well as on mammals, birds, reptiles, amphibians and invertebrate animals.

What is being attempted at this preserve may well suggest activities that could be carried on in other preserves, large or small, in any community. May it be suggested that various outdoor people, and by all means teachers and students, select certain phases of nature lore as hobbies.

The "hunting ground" for these hobbies can well be the local preserve. Of course, various interests will be represented and soon some person or group will have prepared a list of local birds, trees, flowering plants, ferns or amphibians. Thus a survey has been started, and from this point the life histories of the various creatures will gradually unfold. Such

Photograph by A. H. Wright

Typical Breeding Habitat of the Spring Peeper and Tree Toad — Arboreal and Aquatic Songsters

interest, especially on the part of teachers, will surely make itself felt in the community, and nature work will receive a new urge from the real source of knowledge — the outdoors.

Preserves are not fully appreciated until they are used at all seasons of the year. Winter is the season most often neglected; trees and various other plants, for example, are recognized by many people in all seasons except winter. There are interesting plants to be seen in that dormant period, even though snow covers the ground. Have you ever observed silhouettes of trees and plants as they appear against the snow? Some of the most artistic forms are then in evidence. A study of these will help you to know plants the year around. It is one thing to recognize St Johnswort or willow-herb in blossom and quite another to recognize the dead stalks in winter. You will enjoy the plant more when it blossoms in summer if you can recall what it looks like in winter. Many flower stalks of last season remain standing until the new growth is well under way in spring — the granaries of winter birds, the wraiths of last year's beauty.

During winter or in early spring, when the ground is not completely covered with snow, many plant rosettes can be observed. Teasel, mullein, dandelion and daisy are some of the more easily identified ones. The manner of growth, color, form, shape and texture are to be observed when one is learning to know rosettes. It is to be hoped that you find some rosettes that you can not recognize; then you can continue to observe these and see what grows from them. It is a real pleasure to learn plants in such a manner. To collect fullest pleasure from time spent afield one should look at many, not just one of the aspects of nature. Your notebooks thus become prized

histories of your own accumulated nature lore through the years.

While hiking through the woods or along streams for bird or plant study, do you ever stop to notice what may be living under logs, stones or pieces of bark at your feet? Do you recognize such creatures as slugs, snails, or the various kinds of salamanders, frogs or snakes? All of these animals have some interesting habits bound up in the intricacies of their plant environment; but have you given them a chance to perform for you?

For example, a few of the more common salamanders found in New York are red-backed salamander, dusky salamander, two-lined salamander and newt. How many of these do you know? The red-backed salamander is a land form; it is marked with brick-red stripes on the back and is usually found under logs, pieces of bark or stones. The eggs are laid in little clusters, in an old stump or log and protected by the parent. The dusky salamander is, as its name indicates, dark in color — not gray, not brown, not black. It is usually found in water, moves very rapidly and has, as have many other salamanders, the queer power of being able to disjoint its tail. Thus it is able to escape many enemies, by conveniently leaving with them a part of its tail, while its body scurries to safety. The two-lined salamander is tan colored with two dark lines down the back. It, too, is found in streams, usually under small stones. The newt is one of the most interesting creatures to be met with on a hike; it may be seen in water or on land. Its color may vary greatly — from a dull green to a reddish orange, with varying numbers of small red dots along the sides. This animal is a very interesting one for an aquarium or a fish bowl. And the story of its double life in water and woods is one of the most interesting in nature.

Is a frog just a frog to you; or do you recognize as a green frog the large creature that startles you as it splashes into a near-by pool? This is not our largest frog; but it is larger than most of the others you will see. The tadpoles of this species may be observed at almost any time; their development requires one year. Another frog, a tiny one, may tantalize you for hours by appearing to call from a point near you, and somehow managing to keep out of your sight. You may even think you are listening to the shrill call of a bird; but you are being entertained by a hyla or spring peeper. The entertainment is even better at night. Take a flashlight and seek the creature. You will be surprised to see that while the call is being made the frog's throat is puffed out until it appears almost as large as the whole body. As you cautiously approach the pool from which myriads of peepers are calling, the separate voices become painfully piercing to the human ear. These animals are interesting vocalists to the spring saunterer; in fact, they can be heard at almost any season — even in winter if the weather is mild, as during this past January in New York State. Their best season is early spring, even before many of the migrant birds return. Visit some swamp and hear these tiny entertainers. It is worth the effort.

Do you ever notice the insects that are so active about the pond or stream where you are fishing or studying plants or birds? After all, they are a part of the picture; they serve as food for the birds or fish, they pollinate the flowers, or may even injure the plants in some way. They do not exist unto themselves; each species, in its way, has an influence on the others. Consider, for example, the dragonflies, snake doctors or devil's darning needles as they are variously called; these insects spend a large portion of their life span as hungry "nymphs" in the bottom of a stream or pond. Here they devour many smaller insect forms, such as mosquito "wrigglers." And by the way, these insects are not the dangerous creatures that they are accused of being. They do not sew up human ears, neither do they doctor snakes; but they are quite as interesting in their normal lives. If you are fortunate during the summer you may see some of these change from the nymphal to the adult stage. Soon after the nymph leaves the water, its transparent skin splits along the back and the glistening dragonfly we are accustomed to see, emerges. After a while it darts away, about the pond to join its companions, leaving the dry ghost of its former existence clinging to rush or cat-tail stalk.

Even the dragonfly as it plays swiftly about the pond appears no happier than you will be, once you have become inoculated with the outdoor serum and have learned to unlock some of the outdoor secrets. A nature preserve is an excellent place to go for the outdoor serum.

Photograph by Verne Morton

Dandelion Globes of Airy Down

Wayside Weeds

BY ELSIE GIBSON WHITNEY, NEW YORK STATE MUSEUM

We are all familiar with the stories of some natural wonder, such as Mammoth cave, or Yellowstone geysers, or the Big Trees of California, which entice visitors from all parts of the world, but which people who "grew up with them" either take for granted without any special interest or, because they are near at hand and always accessible, never take time to visit.

So with birds and flowers. Our first discovery of a new flower brings shouts of joy. But our interest lags or is crowded out by other things when we find that it is at hand almost anywhere and is so "common" that it may be seen at any time. Something of this attitude of mind is prevalent toward most of the wild plants which share with man the areas he has appropriated for his especial use. There are the dandelion and dock and chickweed, for instance, which spring up in our lawns despite repeated eradication. Sometimes a cultivated field, much to the farmer's disgust, becomes so filled with wild carrot, or mustard, or devil's-paintbrush that one would almost think these plants were being cultivated for a crop. Along the fence rows and roadsides where "clean culture" is more difficult and less frequent, tall evening primrose, milkweed, pokeweed, goldenrod and asters of varying hue hold full sway. Stone walls and wire fences make ideal trellises for the wild morning-glory and the late-blooming clematis or other trailing vines.

Usually these interesting plants are spoken of scornfully as "weeds," and the quickest, most effective method of destroying them is everyone's chief interest in them. This is a quite natural attitude toward plants which compete for space and nourishment with the cultivated crops upon which man depends for a livelihood. Yet the lowliest and most "pernicious weed" is not without beauty and the worth that that implies, if we really know the plant. The wild

folk of the fields have no prejudices against them, as a poet has reminded us:

The cowslip startles in meadows green,
The buttercup catches the sun in its chalice,
And there's never a leaf or blade too mean
To be some happy creature's palace.

While we may think that we are acquainted with the common weeds and know quite enough about them, almost certainly their nearness and ready accessibility have dulled the keen edge of our observation and appreciation of beauty in detail of form, color and setting. We recognize them, "through side windows of the eye," but do not truly see them. The shape, the delicate hue, the unusual structure of some rare exotic flower that men travel long distances and suffer hardships to bring back and tame for the greenhouse or the formal garden may be better known to us than the wild plants that brush against us remindingly in our daily walks. Yet the common weeds of garden and roadside, if regarded sympathetically, are no more lacking in novel beauty than some of the rarest hothouse plants.

Just as an experiment let us look more closely at one of these "commoners" — the dandelion. I suspect that there is scarcely anyone who is not happy to detect the first blossom of this harbinger of early spring. When on a bright sunny morning two or three of these flowers of gold appear on the lawn, the heart of the most hardened weed-chaser involuntarily quickens with delight. With a reading glass or a small hand lens let us examine the "flower" with care. Since there will be plenty of them before the season is over we need not hesitate to take several to dissect and study.

As we pull the head apart we discover that it is made up of a number of separate flowers, each complete in itself, with its united corolla open part way down one side, and falling outward, so that we may have thought this strap-shaped portion a single petal. From within the tubular portion of the corolla there emerges the style with its two-parted stigma curled at the tips. Forming a little ring about the style are the five anthers attached to each other very lightly along their edges. The flower head then, on its single scape, is really a whole colony of flowers, each a tiny gem in itself.

Every morning for several weeks we find myriads of these golden heads scattered over the lawn. Then, suddenly it seems, only a few yellow blossoms remain, but in their places are a myriad of white globes of airy down dotting the lawn. With the first gust of wind these ghosts of the flowers that were, break into a cloud of parachutes that float off in the breeze, each carrying a ripened seed.

The plants that we have been watching are the typical ones found on well-trimmed lawns, their basal leaves forming close rosettes as large as a saucer or small plate, and crowding out all the grass beneath. Perhaps because it so often has been cropped by the lawn mower this dandelion of the lawns does not send up a very long flower scape. Or perhaps because the grass about it is not very tall it feels there is no need to send the head high in the air to obtain all the sunlight it requires. In any case this plant is quite different in appearance from the ones in the tall grass in a damp, shaded spot along the fence row or behind the garage. There the rosette form is largely lost in competing with high plants, and the leaves and flower stalks grow much taller One does not really know dandelions until he has seen the perfection of these large flower heads and the great fluffy balls of the mature seed stage.

Our minute inspection has raised a host of questions. We are interested at once to know the means of pollination of so many flowers in a single head. How does the pollen get to the stigmas when each is just mature? The anthers with their load of pollen grains were found considerably below the stigmas; therefore when they open and discharge the ripened pollen it can not just fall onto the stigmas. Is it a dry and powdery pollen, easily borne by the wind, or of the sticky type that adheres to the feet and antennae of insects until it is rubbed off onto a waiting stigma? Are the anthers mature and ready to discharge pollen at precisely the same time that the stigmatic tissue is mature and receptive in each individual flower? Someone has determined that more than 100 species of insects visit the dandelion heads. These mobile visitors certainly should make a most effective army to perform the work of pollination, provided the pollen were of the right sort. Do the dandelion flowers produce nectar, or just what is the attraction for so many insects?

Between the time of first blossoming and the later appearance of the downy globes, what changes have taken place in the flower heads? How long did it take to make the transformation, and what became of the yellow corollas?

When we observe them in the early morning they are wide awake in a golden glory; but at what hour did the heads open, and when do they close for the day? Do they open at all if the sun is not shining, or when it rains?

The blossoming of dandelions may be observed all through the season, often into December. Does a single plant bloom the whole season through, or is it the maturing of some plants later than others that maintains this "procession of the flowers"? How many seeds are borne in one head? How many separate blooms are there on the average lawn in midseason? One need make only a rough calculation as to the number of seeds produced to know there is a very large crop.

Evidently the seed dissemination by means of parachute and wind is effective, for when the seeds lodge along some barrier — fence row or garage — they quickly occupy the area, sending deeper and deeper the long tap roots that we find so hard to dislodge from the lawn. They are perennial as well as prolific.

Much as we dislike this plant when compelled to "dig it out," we can not but admire the nicety of its economy in gathering the separate flowers into a colony, and the ingenious method of dispersal, which for the species has spelled success, since it is enabled to spread with great rapidity and hold its ground tenaciously.

The dandelion does not stand alone among the many "common weeds" of our fields and roadsides as a plant of unique interests. Every one of those mentioned earlier, and scores of others, if closely observed, offer a wealth of interesting facts about flower construction or adaptation to climate or soil or insect visitors. Any single species followed through a season, or from year to year, brings up a host of problems as to the reasons for its ability to succeed in such numbers. Just the one question of the interrelation of insects and flower, or the part that insects and birds play in pollination or in seed dispersal, would keep one busy for many a day. And each species has its own peculiarities in this field.

The chief function for every plant is, of course, the production of seed to maintain the existence of the species. To discover by what methods these wayside weeds have succeeded so abundantly offers many interesting adventures, with the plants near at hand and easily accessible whenever there are a few free moments to observe them. And while we investigate the methods of pollination, the special attractions to insect visitors, the adaptations for wide dispersal of seed, their adjustment to chance surroundings, we shall gain a new admiration for these lowly neighbors of ours and a joy in the true beauty we had not dreamed they possess.

Water Pictures in the Landscape

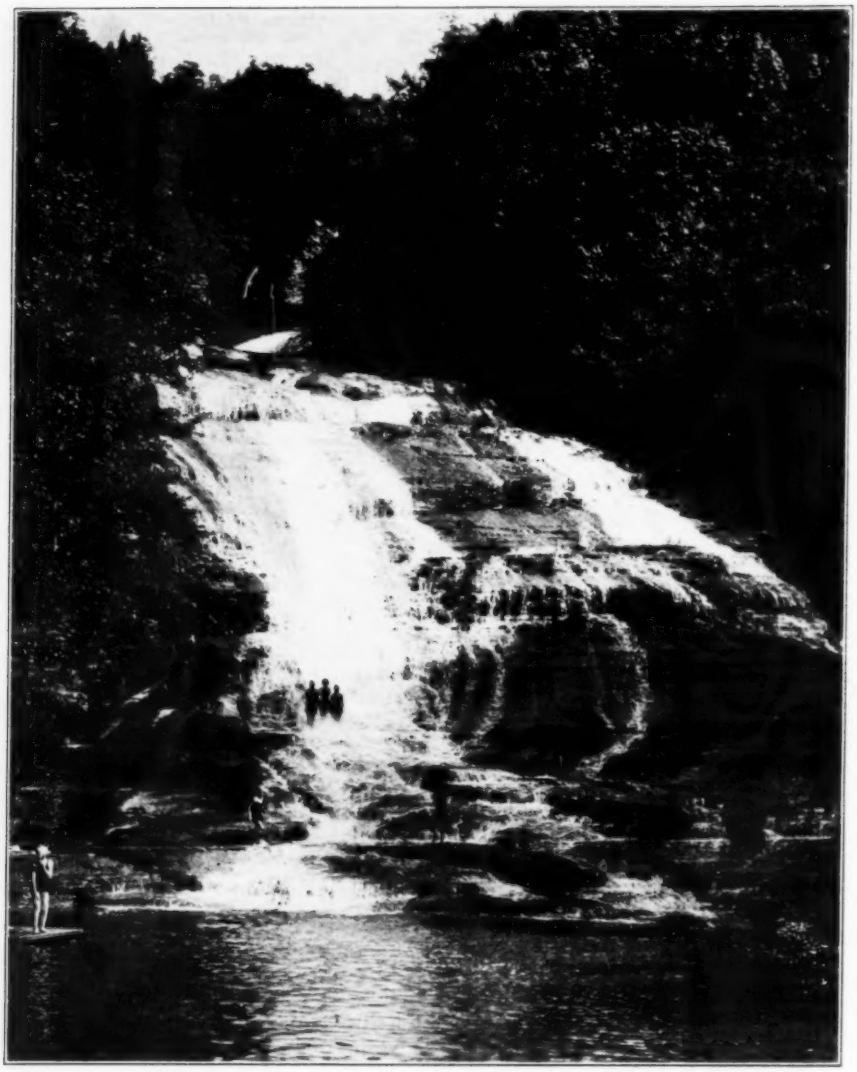
BY HERBERT M. BLANCHE, LANDSCAPE ARCHITECT AND SUPERINTENDENT, FINGER LAKES STATE PARKS COMMISSION

The Indian named a sunlit waterfall "Minnehaha," thus expressing his feeling for its beauty in the landscape. "Laughing Water" — the poetry of the story might well have been woven from the dancing sprays that gleam in the sunlight above thousands of waterfalls in New York State.

From magnificent Niagara to the tiny stream that trickles down into its fern-fringed pool from the rock above, each of our falls has its particular charm.

In the region of the Finger Lakes water creates such varied beauties that to catch their ever-changing charm is a continued joy. The lakes change with every mood of the seasons: in January, coldly green, or with the drifting snowstorms as white veils over the green water; in May, richly blue, with white caps ruffling, and purple cloud shadows sweeping across the sparkle and glisten, all color and movement; in August, steel blue and still, reflecting the rocky shores and trees; but in October, most glorious of all, the blue, white and purple of the spring colors intensified by contrast with the gold and russet woodland that sweeps down the hillside to the water's edge.

Then comes the gossamer of misty mornings when the still water shows hazily through the fog and looming hills appear and disappear above. At evening the glories of the sunset reflected in the mirror of the lake are beyond description, and as the colors fade, mystery



Buttermilk Falls and Pool, Near Ithaca

draws across the water, until, over the hill, the moon comes up to silver the surface and throw deep shadows among the crests above.

Each of the gorges has its stream in never-ending change, lovely always.

In Watkins glen the light filtering down through foliage adds color where the water flashes down into a clear pool, striking white foam that spreads in the stillness as faint emerald, then, where movement ceases, becoming the richest, clearest of green. Again, spray glistens in sunlight, and a rainbow is there, changing in colors, moving, going and coming with the sway of branches above.

There is no need to ask, Why "Buttermilk falls"? for the creamy-hued water foams down 400 feet of rocky slope in tumbling masses that speak the name for themselves. At Taughannock lacy veils float lightly down for over 200 feet into a large, shadowed pool below. Lucifer falls, in Enfield glen, are light and shadow, laughing, fluttering rivulets, and foam glistening incredibly white against black caverns of rock, all among high cliffs rich in pine, maple, oak and ferns. In winter ice in massive yet graceful formations builds upon the faces reflecting brilliant color where lichens and mosses have stained the flow. In Stony Brook gorge huge hemlocks spread their deep green, lacy foliage above tumbling water that gleams, then is lost in a deeply shadowed pool below. "Hemlock falls" has the beauty that comes with strong color contrasts, yet the whole blends into perfect balance.

To keep these waters unmarred so that future generations may enjoy them is a duty that has sometimes been neglected, but those who know their value will see to it that all possible protection is given in the future. So each stream, pool and lake will keep its glory of loveliness, changing with each hour, to be possessed by all who have eyes to see.

Lucifer Falls in Winter (Enfield Glen)

Gardens for Children, a Civic Factor

By Ellen Eddy Shaw, Brooklyn Botanic Garden

Assuming that there is not a garden for children in our communities, either a school garden, community garden or home gardens, let us decide that we are going to start right in and make one.

Who shall do it? That is always the question, is it not? We naturally turn to our schools as the leaders in educational work. In many communities, unless this is a school project, it is a splendid opportunity for garden clubs to do something fine for the next generation. Less talk of conservation and less annoyance and irritation over children's invasions on private grounds will be necessary when we have trained our children in knowledge of gardens and in experience, not in their parents' gardens, but in their own gardens. The mere fact that a child has always seen a beautiful garden at home or has watched the gardener working over plants does not mean that the child himself knows anything about the garden or cares much about it until he has had his own wee plot.

The very best place for a child to have his garden would be at home. Years ago when I was teaching in the Rochester City Training School, I said to the children of the fourth grade in our practice school that anyone could have a garden; it might be in a box, or it might be in a borrowed piece of a neighbor's yard. I was much amused when a woman in that neighborhood told me that two of the little girls from this grade had asked if she would lend them a little place in her yard for a garden. She said that she had lent almost everything under the sun, but had never been asked to lend her garden. She lent these little girls an eight by ten flower bed upon certain conditions, and the children kept these conditions.

Courtesy of Brooklyn Botanic Garden

A Well-Cultivated Garden Gives Little Children Their First Lessons of Life

Why not start out with the idea of encouraging home gardens? One may start with little ones, using such easy-to-raise annuals as dwarf French marigold, sweet alyssum, tall marigold, and zinnia, such delightful speedy vegetables as scarlet globe radish, mignonette lettuce or any other lettuce which grows easily in your particular locality. Try little onion sets, which grow rapidly and which are tied up in the children's minds with the paper white narcissus bulbs that bloom so merrily for them during fall and winter, or beans, big and fat and easy to hold in tiny hands. I remember once having a wooden box in one corner of the kindergarten room in the Ethical Culture School in New York and raising in this, radishes, lettuce and onions from sets, so that at the close of one session little boys and girls had lettuce sandwiches, radishes and young onions.

If children are very young they should work with plant material that grows rapidly and gives fairly sure results in a comparatively short time, but when they are older, say 12 years old, they can wait for results, and add to the vegetable garden, beets and carrots, and possibly turnips for winter, and add to the flower garden bachelor's buttons, calendulas and snapdragons, which look so much like their interesting cousins, the butter-and-eggs.

As one goes on with the study of plant life, much may be linked up and tied together so that this whole world in its birth and growth and development is just one unit dependent upon the big forces of nature.

The older boys and girls might like to carry out their gardening on the plan of projects, such as an American Indian garden of corn, beans, squash, potatoes, and sunflowers. There are not so many plants of everyday life and use that are strictly American. Then how about those more touchy vegetables — peppers, eggplant, celery and all kinds of tomatoes? The seeds of these plants must be started indoors early in the season, thus offering considerable work in care and handling. Then there are garden plans that older boys and girls may make — little flower gardens with color schemes included, where high school teachers of art may help us to realize that certain colors go beautifully together and certain others clash, where yellows form intimate little gardens, and

blues and purples subdue the gay and warm colors and give an effect of distance, so that the garden seems a little larger than it really is. There are all sorts of interesting things that the older boys and girls may do in gardening, such as a peanut garden, a cereal garden, a little Shakspere garden, containing some of the plants mentioned by him, diminutive rock gardens and winter dish gardens.

Whenever a boy or girl starts a piece of work that he must do with his own hands, must care for, must wait for and watch, that is the time when certain traits of character may be developed. Would you like to encourage real responsibility in your child? Start him on his garden. Show him how to plant. Teach him to measure properly the distances between the garden rows, to stretch his garden line and open a drill, to plant his seeds with care and cover them, to label his rows carefully, and then to wait. If he has followed out directions — and what a splendid lesson it is to learn — then his garden comes up in beautiful straight rows or in exactly the manner planned out. If he has not been able to take his directions correctly, his garden comes up in a careless manner. There is no side-stepping this. In a great many pieces of work we can side-step and fool ourselves, but this little piece of work called the garden does check us up.

It is a simple thing for a school to give garden lessons. Even though the children are not to do their gardening at school, first lessons in planting and cultivating may be given there, and the work carried on at home. If the woman's club is doing this work, it may easily be divided into lessons in planting, then lessons in cultivating, thinning and transplanting carried on perhaps by someone else who does the visiting of these gardens through the summer.

Many ask the question, "Shall we give prizes for garden work among children?" Personally, I would not give money prizes. Garden books, good garden tools, subscriptions to nature and garden magazines, and medals are all excellent types of prizes, prizes which anyone may win. I like competitions out of which the personal rivalry has been taken. It is better to give many prizes of little value than one prize of great value, unless such a prize be a scholarship in a college. Children are just as much interested and pleased with ribbons and cards such as are given in our flower shows as they are in other more valuable prizes.

A Wild Flower Card Catalog

BY ELOISE P. LUQUER, CHAIRMAN, CONSERVATION COMMITTEE OF THE GARDEN CLUB OF AMERICA

My definition of conservation is temperance, for I want all to be moderate in the picking of wild flowers, or better still to refrain from picking them at all. Let people go out into the fields and woods and enjoy the flowers where they grow so happily and learn their habits and charm by careful observation.

In the country each school child can select a special plant, put a label by it and have it for his own "best friend," visit it often, observe its growth, blooming and going to seed, and then watch next spring for it to come up and begin its life anew. Meanwhile, he may keep a notebook of all the interesting changes that take place in the plant.

A child should not feel that a bouquet of wilted, half-dead flowers must be brought to teacher every morning, but should realize how many lonely, precious flowers are being destroyed by such wasteful and unnecessary picking, which gives no lasting pleasure, as the flowers die so soon.

Learn the flowers that may be picked freely, such as the violets and daisies and all flowers belonging to the composite family. If a flower has to be picked to be analyzed, let the teacher or leader of the class pick just one for that purpose, but if there is only one flower on the specimen never pick it, for you are destroying the chance for seed to form and are ending its life forever.

If the school child lives in the city and can not go into the woods to find flowers, he may go to museums to see specimens or to

herbariums, and may cut pictures of wild flowers out of magazines. A child living on a farm in the country may make a card catalog of all the growing things on the place or in the woods near-by. I keep a card catalog of my nature treasures and note each year when the plants appear, when they bloom and go to seed, and how they increase from year to year. I lived many years on an old farm of 40 acres, and on that I found and painted 264 different flowers.

Try and draw the flowers in your notebook, as an interest in botany will give you a hobby which you can enjoy all your life. The accompanying picture is one from my collection of 400 wild flowers that I have painted. I made this collection before there was any special conservation program and while the wild flowers were plentiful; now I observe and do not pick.

The flower illustrated is the *Cypripedium pubescens*, one of the flowers protected by law in New York and one of the flowers that can be easily cultivated under proper conditions.

Moccasin Flower

A161m Mr32-14,500(10026)*

UNIVERSITY OF THE STATE OF NEW YORK PRESS